

REMARKS

The Office Action of August 2, 2010 was received and carefully reviewed. Claims 13-15 and 18-19 are currently pending in the instant application, of which, claims 16 and 17 are withdrawn. Reconsideration and withdrawal of the currently pending rejections are requested for the reasons advanced in detail below.

Claims 13-15 and 18-19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hamamoto et al. (JP Patent No. 2002-124297, translation, hereinafter “Hamamoto ‘297”) in view of Hamamoto et al. (U.S. Patent Publication No. 2002/0122988, hereinafter, “Hamamoto ‘988”)/(U.S. Patent No. 6,866,966 hereinafter, “Hamamoto ‘966”) or Hamamoto et al. (U.S. Patent No. 6,927,001, hereinafter, “Hamamoto ‘001) and further in view of Koshina (U.S. Patent No. 6,872,156, hereinafter “Koshina ‘156”). This rejection is traversed for the reason below.

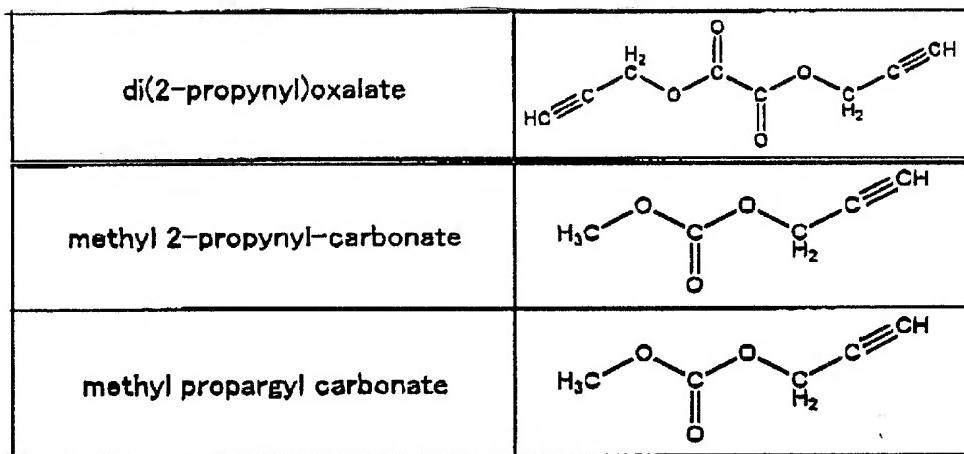
In accordance with the M.P.E.P. § 2143.03, to establish a *prima facie* case of obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 409 F.2d 981, 180 USPQ 580 (CCPA 1974). “All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 196 (CCPA 1970). Applicant contends that the Examiner has failed to establish a *prima facie* case of obviousness in this case, because each aspect of the recited invention is not taught or suggested by the cited art.

Addressing the Office Action, the Examiner understands that Hamamoto ‘297 teaches the use of an alkyne compound corresponding to Applicant’s recited alkyne compound (VI) in an electrolyte solution and the use of vinylene carbonate (VC). Further, the Examiner correctly understands that Hamamoto et al. ‘297 does not teach the amount of vinylene carbonate present.

As for the amount of vinylene carbonate in an electrolyte solution, the Examiner relies on Hamamoto '988 or Hamamoto et al. '001. Hamamoto '988 certainly appears to teach the use of vinylene carbonate in an amount of 2 wt.%. However, it should be noted that Hamamoto '988 merely teaches a combination of 2 wt.% of vinylene carbonate and methyl 2-propynyl carbonate and does not teach the combination of 2 wt% of vinylene carbonate and the oxalyl group-containing alkyne compound belonging to Applicant's recited alkyne compound of formula (VI). The Examiner does note a formula of the methyl 2-propynyl carbonate. It is clear, however, that the 2-propynyl carbonate of Hamamoto '988 is not the oxalyl group-containing alkyne compound of the currently recited invention.

With regard to Hamamoto '001, this patent certainly appears to teach the use of vinylene carbonate in an amount of 1.5 wt.%. However, it should be noted that Hamamoto '001 merely teaches a combination of 1.5 wt.% of vinylene carbonate and methyl propargyl carbonate (which is the same as the above-mentioned methyl 2-propynyl carbonate) and does not teach the combination of 1.5 wt% of vinylene carbonate and the oxalyl group-containing alkyne compound belonging to Applicant's recited alkyne compound of formula (VI). The Examiner again notes a formula of the methyl propargyl carbonate. It is clear again, however, that the methyl propargyl carbonate of Hamamoto et al. '001 is not the oxalyl group-containing alkyne compound.

In order to assist the Examiner in recognizing the difference between the methyl 2-propynyl carbonate (or methyl propargyl carbonate) and the recited oxalyl group-containing alkyne compound, particularly, di(2-propynyl)oxalate, Applicant illustrates below the chemical formulas of these compounds.



Turning to the disclosure of Hamamoto '297, the invention of Hamamoto '297 is directed simply to the use of the alkyne compound (VI) in a non-aqueous electrolytic solution for lithium secondary batteries. Although Hamamoto '297 describes possible use of vinylene carbonate as one component of the non-aqueous solvent, there is given no teaching to the effect that the use of vinylene carbonate in combination with the alkyne compound (VI) brings about certain favorable effects in comparison with the use of the alkyne compound (VI) in combination with other non-aqueous solvents. No working examples are presented for the use of the combination of the alkyne compound (VI) and vinylene carbonate. It is pointed out, further, that the discharge capacity retentions of lithium secondary batteries are evaluated in the form of a coin battery in relatively mild conditions such as the 50 cycle charge-discharge procedures at room temperature (20°C) and at 0.8 mA.

In contrast, in Applicant's claimed invention, a lithium secondary battery claimed in the instant application has been made based on the inventors' finding that the lithium secondary battery employing a non-aqueous electrolytic solution containing the combination of a small amount of a vinylene carbonate of formula (I) and a small amount of an alkyne compound of formula (VI) shows a prominently improved discharge capacity retention (i.e.,

remaining rate of discharging capacity) after repeated charge-discharge procedures such as 300 cycle charge-discharge procedures at such a high temperature as 60°C and at such a high charge-discharge current as 2.2A (1C) when the above-mentioned electrolytic solution is employed in a cylindrical battery in combination with the combination of the positive electrode and negative electrode both having the defined high density.

The above-mentioned finding is experimentally shown in the specification. Specifically, Example 13 describes a lithium secondary battery employing an electrolytic solution containing a combination of 0.2 wt.% of di(2-propynyl) oxalate and 3 wt.% of vinylene carbonate (see Example 1) which shows such a high discharge capacity retention after 300 cycles as 81.7%. The Examiner is requested to compare this high discharge capacity retention with the discharge capacity retention of 64.3% which is seen in the lithium secondary battery of Comparison Example 1 (containing 3 wt.% of vinylene carbonate and no alkyne compound) in Table 1.

In addition, one of the inventors performed additional experiments for the purpose of making clearer the prominent improvement in the discharge capacity retention provided by the claimed invention. The results of these additional experiments are provided in a Declaration Pursuant to Rule 132 (attached). These additional experiments provide further evidence of the unexpected results of the presently claimed invention. None of the references to Hamamoto et al., taken alone, or in combination, teach the novel combined features of the presently claimed invention.

Koshina gives neither teaching nor suggestion concerning the electrolytic solution specified in claims, and, thus, fails to overcome the deficiencies of the Hamamoto et al. references.

DOUBLE PATENTING

Claims 13-15 and 18-19 were provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-6 and 8 of co-pending Application No. 10/584,266 in view of Koshina. Without conceding the merits of this rejection, a Terminal Disclaimer relating to the Application No. 10/584,266 is hereby submitted to overcome this rejection in order to expedite prosecution of the instant application.

CONCLUSION

In view of the foregoing remarks, this claimed invention, as amended, is not rendered obvious in view of the prior art references cited against this application. Applicant therefore requests the entry of this response, the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

In discussing the specification, claims, and drawings in this response, it is to be understood that Applicant in no way intends to limit the scope of the claims to any exemplary embodiments described in the specification and/or shown in the drawings. Rather, Applicant is entitled to have the claims interpreted broadly, to the maximum extent permitted by statute, regulation, and applicable case law.

Except for issue fees payable under 37 C.F.R. § 1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§ 1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 19-2380. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. § 1.136(a)(3).

Should the Examiner believe that a telephone conference would expedite issuance of the application, the Examiner is respectfully invited to telephone the undersigned at (202) 585-8207.

Respectfully submitted,

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